

**A METHOD TO PROVIDE A SERVICE, A SERVICE PROVIDER REALIZING  
SUCH A METHOD AND A UNIVERSAL PERSONAL  
TELECOMMUNICATION NETWORK INCLUDING SUCH A SERVICE  
PROVIDER**

5       The present invention relates to a method to provide a service as described in the preamble of claim 1, a service provider realizing such a method as described in the preamble of claim 2 and a universal personal telecommunication network including such a service provider as described in the preamble of claim 9.

10      Such service provider is already known in the art, e.g. from the European Telecommunication Standards Institute Standard at the internet site with the address :

<http://docbase.etsi.fr/Tech-org/smg/Document/smg1/SMG1-UMTS-Specifications/NEW/>

15      with reference TR 22.70 V3.0.0 (1998-03) entitled "Universal Mobile Telecommunication System (UMTS); Service Aspects; Virtual Home Environment (VHE) (UMTS 22.70 version 3.0.0).

20      This document describes the Virtual Home Environment concept and its constituent parts. A concept called service environment is introduced to describe how virtual home environment services will be made available on demand to a user traveling with its terminal in any location. The concept of virtual home terminal is discussed in order to describe how a virtual home environment can be made available in any terminal.

25      The following paragraphs are describing a summary of this document, in order to provide an indication of the background art which can be regarded as useful for understanding the invention.

30      A virtual home environment is defined as a system concept for personalized service portability, across network boundaries and between terminals. The concept of the virtual home environment is such that universal personal telecommunication system UMTS users are consistently presented with the same personalized features in whatever network and whatever terminal,

wherever the user may be located. The exact configuration available to a user at any instant will be dependent upon the capabilities of the user service identity module, called hereafter USIM, terminal equipment and network currently being used or on the subscription restriction. Such a USIM is a unique personal

5 identification of a user to a subscriber and a service provider. A user with its  
USIM in another terminal, receives maximum capability provided depending on  
the limitation of the terminal. A virtual home environment is created by a  
combination of the capabilities located in the service provider, network operators  
and the terminal equipment. In effect, the virtual home environment of a user is  
10 considered as a distributed user profile. The profile outline is owned by the  
service provider, and it is distributed between the terminal equipment, personal  
identification card, network operator and service provider. This means that to the  
service provider, the virtual home environment appears as a list of capabilities,  
preferences and settings appropriate to the user and its subscriber. It is also  
15 described in the above cited document that a commercial relationship is required  
between a service provider and a network operator, either directly or indirectly.

The components involved in realization of a virtual home environment  
of a user are the following : one user, one service provider, one or more value  
added service providers i.e. content providers of services such as video on  
20 demand or entertainment information provider, one USIM i.e. unique personal  
identification of the user, one IC card, one subscriber, one subscription of the  
subscriber to the above mentioned service provider, one or more terminals, one  
or more network operators.

A user is associated with one service provider and the service provider  
25 provides virtual home environment according to the subscription. The service  
provider can use a plurality of network operators in order to support the virtual  
home environment for the user.

Individual users have a virtual home environment which is based on a  
subset of the total services. Whilst the user may have a set of services he would  
30 expect to be offered, these are only offered if permitted by the subscriber and the  
service provider. From the users point of view, the use of the network is hidden.

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In order to disclose the invention as claimed, the following paragraph describes an example.

Presume a universal personal telecommunication network which includes a subnetwork. According to the virtual home concept a user, being identified with its personal identification number is associated to one service provider, called its home service provider. The home service provider provides a virtual home environment according to the subscription of the user. Presume that this home service provider has a commercial relationship with this subnetwork e.g. a mobile subnetwork, called hereafter a home subnetwork. The home subnetwork is attached to the home service provider. Furthermore, presume that the home service provider offers access for all its subscribers to a list of services e.g. hotel information, roadmap information, flight information of the airport, restaurant information, etc. .

In the event that the user desires to get access to the personal telecommunication network, the user submits an access request via a terminal e.g. its mobile telephone and via the home subnetwork to the universal personal telecommunication network. The home service provider provides a notification to the user which includes the capability for the user to accept the list of services of its home service provider. In this way, the user can select this offered service and, furthermore, can select e.g. the offered hotel information.

In the event when the user makes a journey, the user can get access to the telecommunication network due to :

- an agreement between the operator of its home subnetwork or its home service provider and an operator of a subnetwork in the environment of its destination or the service provider whereto this other subnetwork is attached also due to a commercial agreement; and

- the right settings of its user profile offered by its subscriber and its home service provider.

Indeed, an interworking between the two subnetworks is required as well as the permission for the user to get access to the telecommunication network via another subnetwork. When the user, at the destination of its journey,

makes an access request with its mobile telephone to the telecommunication network, the access is requested via this other subnetwork i.e. a mobile network, called hereafter access subnetwork. Due to the existing interworking between the access subnetwork and the home subnetwork the profile of the user can be  
5 checked. When the profile of the user permits access via this access subnetwork, the home service provider of the user provides a notification to the user which includes the capability for the user to accept the list of services of its home service provider. In this way, the user can select this offered service and, furthermore,  
10 can select e.g. the offered hotel information. However, the offered hotel information is mostly information of the local environment of its home service provider e.g. the coverage area of the home subnetwork.

In fact, the offered services by the home service provider are the same whatever the terminal's position within the telecommunication network. The services offered to the user, at its home area or at a visited area, are the services  
15 of its home service provider offered by its home service provider via a home subnetwork or via a subnetwork of the visited area.

An object of the present invention is to provide a method to provide a service to a user, such as of the above known type but which has not the above drawback of offering to a user only the services of a home service provider, if  
20 any.

According to the invention, this object is achieved by the method of claim 1 which is realized by the service provider of claim 2 and by the telecommunication network of claim 9 which includes such a service provider.

Indeed, by including in the method the step of providing by a notifying  
25 service provider to the user via an access subnetwork, i.e. the subnetwork via which the user requests access to the telecommunication network, a notification which includes a capability to accept a service of an offered service provider, a virtual visited environment is offered to the user. Such a virtual visited environment is similar to a virtual home environment but is identified by the user  
30 and the offered service provider, which can be e.g. totally different of its home service provider. In this way, the concept virtual visited home environment, is

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offered to the user. Such a virtual visited home environment offers to the user the same way and feel independent of the terminal and the network in use, over both fixed and mobile access networks, and on different type of terminals varying from simple voice only terminals to powerful laptops. It has to be understood that

5 similar as to the user profile as defined in the above mentioned standard for the virtual home environment, also a visited user profile has to be defined. Usually, such a visited user profile will be more restricted as compared with a general home user profile. On the other hand, such a visited user profile might offer alternative payment methods which offers, once fulfilled, the possibility to select a  
10 broader list of services.

It has to be remarked that in an embodiment of the present invention, in the event when the notifying service provider is the home service provider of the user, the offered service provider is different of the notifying service provider. Indeed, in the event when the notifying service provider and the offered service  
15 provider are both constituted by the home service provider, the home service provider provides to the user a notification which includes a capability to accept a service of itself, which brings us in the above mentioned prior art situation.

An advantage of such a universal personal telecommunication network which includes a plurality of service providers whereof each one of the  
20 service provider includes a notifying means to provide such a notification to the user, is that a user can go anywhere in the area of the telecommunication network, i.e. the area covered by the subnetworks being associated to anyone of the plurality of service providers, and upon requesting access to the telecommunication network via one of these subnetworks, called access  
25 subnetwork, the user is enabled to accept a service of anyone of these service providers, called offered service provider, which is offered by anyone of these service providers, called notifying service provider.

It has to be remarked that, in the event when the offered service provider and the notifying service provider are different service providers, an  
30 interworking, direct or indirect, between one of the subnetworks associated to the

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offered service provider and one of the subnetworks associated to the notifying service provider, is evident to a person skilled in the art.

A first embodiment of the present invention is that the notifying service provider is constituted by a service provider which is associated to the access subnetwork whereby a virtual environment is identified with the service provider and the access subnetwork. This is described in claim 3.

Another possible implementation is that, in the event when the service provider according to the invention i.e. the notifying service provider being associated to the access subnetwork, is also constituted by the offered service provider. This is described in claim 4 and brings us in the situation, if referring to the above mentioned example of the service of hotel information, that the service provider associated to the accessed subnetwork, at a visited location, is enabled to offer its own services to users which are visiting its area. The offered hotel information will be information of the local hotels. It has to be remarked that the service is offered by the service provider, even when no interworking between the access subnetwork and the home subnetwork is established and even more, also when the user has no home subnetwork at all. Indeed, the offered services by the offered service provider might be free of charge or on the other hand might include possibilities to pay e.g. with creditcards in order to get access to more services which are not free of charge anymore.

Yet, another possible implementation is similar to the above paragraph, but differs that the offered service provider is different of the notifying service provider. This brings us in the situation that the notifying service provider, being associated to the access subnetwork, provides a notification which includes the capability to the user to accept a service of a related service provider e.g. the service provider whereto a neighboring subnetwork is associated but with which a commercial agreement is established. In the event when such an offered service provider is the home service provider, the service provider of the invention provides the notification to the user to accept the services of its offered home service provider or not. This is described in claim 5.

Another possible implementation is, still in the situation that the notifying service provider is associated to the access subnetwork, that the notifying service provider is also the home service provider of the user. This brings us in the situation that a user which requests access in its home area i.e.

- 5 the area of its home subnetwork, receives a notification of its home service provider which includes the capability to the user to accept, besides the services of its home service provider, also the services of other service providers e.g. service providers which are associated with neighboring subnetworks. In this way, again following the example of hotel information, the user is enabled to
- 10 accept from its home service provider, the service of the service provider of the area which he is going to visit and to inquire the information of the hotels of the visited area in advance. This is described in claim 6.

Yet, another implementation is that the notifying service provider is not associated to the access subnetwork. As already mentioned above, it has to be

- 15 understand that in this situation, in order to provide a notification by the notifying service provider to the user via one of its own associated subnetworks and via the access subnetwork, that both subnetworks are interworking with each other. Now, it is described in claim 7 that the service provider of the invention in such a situation is also constituted by the home service provider of the user. In this way,
- 20 it is the home service provider of the user which offers the service of other service providers via the access subnetwork.

- 25 Finally it is described in claim 8 that, similar to the above situation, the offered service provider is associated to the access subnetwork. Indeed, the user being in a visited location and requesting access via an access subnetwork which is not its home subnetwork, receives a notification, via a home subnetwork associated to its home service provider and via the access subnetwork, which includes the capability to accept the services of the local visited service provider. Again, the user is enabled to accept the service of this local service provider and to select the information of the local hotels.

- 30 The above and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the

following description of a not limiting embodiment taken in conjunction with the accompanying drawings wherein Figure 1 illustrates the system concept of a virtual home environment of a user and a virtual visited environment for this user.

First, the working of the method of the present invention will be  
5 explained by means of a functional description of the functional blocks shown in  
the figure. Based on this description, implementation of the functional blocks will  
be obvious to a person skilled in the art and will therefor not be described in  
detail. In addition, the principle working of the method to provide a service will  
be described by means of an example of a possible situation which is a preferred  
10 embodiment of the present invention.

In a universal personal telecommunication network a user U is  
associated to its subscriber and its home service provider SP-H. A virtual home  
environment VHE is a system concept which provides personal service portability  
across network boarders and between terminals. The concept virtual home  
15 environment is such that the user U is consistently presented with the same  
personalized features, user interface capabilities and services in whatever  
network and whatever terminal, wherever the user may be.

The Figure shows this virtual home environment concept VHE for a  
user U. A subscriber (not shown in the Figure) has an commercial agreement i.e.  
20 a subscription with the home service provider SP-H. The subscriber authorizes to  
user U to use some predefined services under this commercial agreement.  
Presume that this service provider SP-H is located in Antwerp. The home service  
provider SP-H has one or more relations with network operators. The Figure  
shows a relation between the home service provider of user U and :

25           - a plurality of fixed subnetworks SUB-F1-H;  
          - a first plurality of mobile subnetworks SUB-M1-H; and  
          - a second plurality of mobile subnetworks SUB-M2-H.

In order not to overload the figure only the first one of each plurality is  
shown. Presume that the plurality of fixed subnetworks SUB-F1-H and the first  
30 plurality of mobile subnetworks are each covering the area of Belgium.

Furthermore, presume that the second plurality of mobile subnetworks is covering the area of Italy.

The system concept virtual home environment VHE of the user U provides to the user U the same look and feel of a service independent of the 5 used terminal and network.

It has to be explained that the service provider SP-H offers a set of services whereof a list of hotels in the environment of Antwerp. This list includes the telephone numbers, addresses, ranking and standard prices of the hotels in the environment of Antwerp. These services are free of charge and are offered to 10 its subscribed users but are also offered to no subscribed users via a virtual visited environment. This virtual visited environment will be explained in a further paragraph.

Now, as it is shown in the Figure, additional relations are established between :

15 - the second plurality of mobile subnetworks SUB-M2-H and another service provider i.e. SP-V, located in Milan, and called hereafter the visited service provider which will be explained in a further paragraph;

- this visited service provider SP-V and a second plurality of fixed subnetworks SUB-F2; and even more, also between

20 - the two mentioned service providers SP-H and SP-V.

The relation between the visited service provider SP-V and the second plurality of fixed subnetworks SUB-F2 is mentioned e.g. in order to illustrate that the mentioned relations are not limitative and that still other relations (not shown) are possible between service providers and subnetworks.

25 Similar to the offered services of the home service provider, also the visited service provider at Milan, offers a set of services. This list of services is again including a list of hotels, but this time, of the environment of Milan. The list of hotels is again offered, free of charge, to its subscribed users but also to no subscribed users by means of a virtual visited environment.

30 In this preferred embodiment the terminal used by the user U is defined to be a personal mobile telephone set T.

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According to the present invention, once the user U requests access to the personal telecommunication network via its terminal T, a notification will be provided to the user U. Presume that according to the commercial relation between the two service providers the following agreement has been established :

5            - in the event when a user, which is associated to one of the two service providers being its home service provider e.g. SP-H, requests access via a subnetwork e.g. SUB-M2-H which also has a commercial relation with the other service provider e.g. SP-V, the notifying service provider is constituted with the home service provider SP-H and besides its own services, the notifying service

10          provides a notification to the user which includes a capability to accept a service of the other service provider SP-V which constitutes thereby the offered service provider. This agreement means that as well the home service provider SP-H as the visited service provider must be able to fulfill the notification according to the invention. Indeed, in the event of a second user (not shown) being associated to

15          the visited service provider as its home service provider, the roles of notifying service provider and offered service provider are exchanged between both service providers SP-H and SP-V.

In order to execute the notification according to the invention each service provider SP-H and SP-V includes a notifying means, i.e. NOT, to provide a notification to a user. Such a notifying means includes in fact the capability to open to a user the door to another service provider i.e. the offered service provider. It has to be understood that this requires the necessary information at the notifying service provider to identify and to establish a communication between the user and the offered service provider.

25          At the side of the offered service provider, a virtual visited environment is identified by the means of service subscription following a visitor profile. This means that a user which receives the services of a service provider via a notification of a notifying service provider, only receives the services following the subscription of the visitor profile.

30          In order to explain the principle working of the method of the invention, an example of a possible situation is described hereafter.

Presume the situation as above described. A user with its home service provider in Antwerp which is associated with three plurality of subnetworks SUB-F1-H, SUB-M1-H and SUB-M2-H covering the area of Belgium, Belgium and Italy respectively. In the event when the user U travels to Milan and desires

- 5 to require hotel information of the local place, i.e. Milan, he first executes an access request R to the universal personal telecommunication network, via its mobile telephone T and via the mobile telephone network of the environment i.e. subnetwork SUB-M2-H. It has to be remarked that following the invention this subnetwork SUB-M2-H is defined as the access subnetwork. The access
- 10 subnetwork is associated to the service provider in Milan SP-V which is defined hereby as the visited service provider. The subnetwork SUB-M2-H and the visited service provider SP-V are defining together a virtual environment.

Due to the personal identification number of the user U, the service provider SUB-M2-H knows that the user U has its subscription via a subscriber

- 15 with the service provider SP-H in Antwerp i.e. the home service provider. On the other hand, the fact that the access request is entered via the access subnetwork SUB-M2-H which has also a relation with the service provider in Milan SP-V i.e. the visited service provider and due to the commercial agreement between the home service provider SP-H and the visited service provider SP-V, the home
- 20 service provider SP-H creates a notification in its notifying means and provides this notification N(SP-V) via the access subnetwork SUB-M2-H to the user U. This notification N(SP-V) includes a capability to accept a service of an offered service provider which is in this case the visited service provider SP-V. The offered service is the virtual visited environment identified by the user and the visited service
- 25 provider SP-V. The user accepts this offered service and receives services in line with the subscription of the visitor profile. The services offered by the offered service provider are restricted following the subscriptions of the visitor profile. However, as it is mentioned above, a list of the hotels of Milan is offered free of charge to the visited user whereby the user is enabled to make an inquire of this
- 30 list.

It has to be remarked that although in the preferred embodiment a mobile telephone has been chosen as the terminal via which the user communicates, the application of the invention is not limited to only mobile telephone sets. Indeed, as explained following the system concept of a virtual

5 home environment and similar following the system concept of a virtual visited environment, small modifications evident to a person skilled in the art, may be applied to the above described embodiment in order to adapt it to be integrated with other kind of terminals e.g. a portable personal computer or a mobile telephone set integrated in a car.

10 While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention, as defined in the appended claims.